

REMARKS

In view of the following remarks, reconsideration of the outstanding office action is respectfully requested.

Claims 80-83, 88-90 are rejected under 35 U.S.C. §112, first paragraph, because the specification while being enabling for the inclusion of nucleic acids in circuit elements including resistors, transistors and diodes, does not reasonably provide enablement for incorporation of nucleic acids into circuit elements including capacitors and inductors.

The applicants respectfully disagree. Biology is one of the most unpredictable of the arts. However, applicants are not relying on in vivo effects. Rather the nucleic acid molecules are used as a template for forming electronics. Manipulations of nucleic acid molecules through hybridization and molecular biology techniques are well understood and readily repeatable.

Tan is cited because it indicates a common problem with molecular circuitry. Namely, it is difficult to connect various molecular circuit elements. This is the problem that the current invention overcomes. Nucleic acid molecules carry information in the nucleic acid base sequence that can be used to direct the interactions of various components. The nucleic acid molecule template allows for “smart” substrates which now have the information needed to direct their own assembly. Specific sequences associated with one electronic element can be used to hybridize with the complementary sequence associated with a second element.

Nishino is cited to show that there is high level of unpredictability in the art of capacitor formation. Nishino specifically indicates that “although sufficient research and development is being done on solid electrolytic capacitors **based on organic materials**, because of the inefficient capacity achievement rate, this type of capacitor has yet to reach practical application” (bold added). Nishino is discussing capacitors where the capacitive material is organic. In the present invention, the nucleic acid molecule, the organic component, is utilized as a scaffold for the formation of a capacitor. The capacitive material can be any traditional material which can be targeted to the nucleic acid molecule, including metals, doped metals, and conductive plastics. Capacitors have been utilized widely in the field of electronics and general methods for design and production are well understood.

Cornett is cited as indicating the problems associated with the formation of inductors on the surface of an integrated circuit. The current invention is not limited to the

formation of electronic elements on the surface of a chip and therefore overcomes many of these problems. Nucleic acid molecules can be made into three dimensional structures which can not be formed on the surface of a chip. Furthermore, nucleic acid molecules can be isolated in many different lengths allowing for relatively large scale structures, when discussing integrated circuits.

The current invention overcomes the problems traditionally associated with molecular electronics and general capacitor. Furthermore, the materials and structures needed to fabricate capacitors and inductors are well known in the art and these materials and structures can be replicated using the nucleic acid molecule as a template. The nucleic acid molecules perform a structural role and are not electronically active. Together with the high skill level in the art, undue experimentation would not be required to perform the methods in the claimed invention.

Claims 72-90 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-10, 15-17, 20-21, 24-25, 32-35, 38 and 44-46 of U.S. Patent No. 6,664,103 ('103 herein).

The rejection under the doctrine of non-statutory obviousness-type double patenting in view over claims 1-10, 15-17, 20-21, 24-25, 32-35, 38, and 44-46 of U.S. Patent No. 6,664,103 ('103 herein) is respectfully traversed in view of the attached terminal disclaimer.

Claims 72, 74-76 and 84 are rejected under 35 U.S.C. §102(b) as being anticipated by Hollenberg et al (US Patent 5,561,071; October 1996).

The applicants respectfully disagree. Hollenberg does not teach or suggest, "two or more sequential regions which are coated with different materials" as recited in claim 72. The Office's attention is respectfully directed to Figure 1 in Hollenberg which illustrates a shadowing technique to deposit a conductor. In this shadowing technique a substance B is deposited leaving an uncovered track adjacent to a DNA strand (Step 1); a substance C is deposited at the uncovered track (Step 2); the DNA and substance B are removed (Step 3); and a substance D is deposited on substance C and substrate A, but not on the DNA strand which has already been removed (Step 4). Accordingly, the deposition of different materials in Hollenberg is after the DNA strand is removed and is not along sequential regions of the DNA strand. With the present invention, by having two or more sequential regions along a length of the template coated with different materials, different types of circuit elements can be formed, such as the resistor and diode shown in Figure 1 and 2 of the current application.

Accordingly in view of the foregoing comments, the Office is respectfully requested to reconsider and withdraw this rejection. Since claims 74-76 and 84 depend from and contain the limitations of claim 72, they are distinguishable over the cited reference and are patentable in the same manner as claim 72.

Claim 77 is rejected under 35 U.S.C. §103(a) as being unpatentable over Hollenberg as applied to claims 72, 74-76 and 84 above, and further in view of Huber et al (FASEB, 1993, vol. 7, p. 1367-1375).

In view of the above remarks regarding Hollenberg, the applicants respectfully request the Office to withdraw this rejection. As discussed above, Hollenberg does not teach or suggest, "two or more sequential regions which are coated with different materials" as recited in claim 72. Huber does not teach this limitation and therefore does not overcome the deficiency of Hollenberg. Since claims 74-76 and 84 depend from and contain the limitations of claim 72, they are distinguishable over the cited reference and are patentable in the same manner as claim 72.

In view of all of the foregoing, applicant submits that this case is in condition for allowance and such allowance is earnestly solicited.

Respectfully submitted,

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